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1 Style-based inverse kinematics

 Keith Grochow, Steven L. Martin, Aaron Hertzmann, Zoran Popović
August 2004 SI GGRAPH '04: ACM SIGGRAPH 2004 Papers

Publisher: ACM

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This paper presents an inverse kinematics system based on a learned model of human poses. Given a set of constraints, our system can produce the most likely pose satisfying those constraints, in real-time. Training the model on different input data leads ...

Keywords: Character animation, Gaussian Processes, Inverse Kinematics, machine learning, motion style, non-linear dimensionality reduction, style interpolation

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2 Style-based inverse kinematics

 Keith Grochow, Steven L. Martin, Aaron Hertzmann, Zoran Popović
August 2004 ACM Transactions on Graphics (TOG), Volume 23 Issue 3

Publisher: ACM

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4 Motion capture-driven simulations that hit and react

Victor Brian Zordan, Jessica K. Hodgins

July 2002 SCA '02: Proceedings of the 2002 ACM SIGGRAPH/Eurographics symposium on Computer animation

Publisher: ACM

Full text available:  pdf(6,90 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

Controllable, reactive human motion is essential in many video games and training environments. Characters in these applications often perform tasks based on modified motion data, but response to unpredicted events is also important in order to maintain ...

Keywords: computer games, motion capture and human body simulation, physically based animation, virtual environments

4 Interactive manipulation of rigid body simulations

Jovan Popović, Steven M. Seitz, Michael Erdmann, Zoran Popović, Andrew Witkin

July 2000 SIGGRAPH '00: Proceedings of the 27th annual conference on Computer graphics and interactive techniques

Publisher: ACM Press/Addison-Wesley Publishing Co.

Full text available:  pdf(886.24 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#)

Physical simulation of dynamic objects has become commonplace in computer graphics because it produces highly realistic animations. In this paradigm the animator provides few physical parameters such as the objects' initial positions and velocities, ...

Keywords: animation with constraints, physically based animation

5 Fluid simulation: SIGGRAPH 2006 course notes

6 Fedkiw and Muller-Fischer presentation videos are available from the citation page

Robert Bridson, Ronald Fedkiw, Matthias Muller-Fischer

July 2006 SIGGRAPH '06: ACM SIGGRAPH 2006 Courses

Publisher: ACM

Additional Information: [full citation](#), [appendices](#) and [supplements](#), [abstract](#), [references](#), [index terms](#)
Full text available:  pdf(1,92 MB)

These course notes are designed to give you a practical introduction to fluid simulation for graphics. The field of fluid dynamics, even just in animation, is vast and so not every topic will be covered. The focus of these notes is animating fully three-dimensional ...

6 Hybrid simulation of deformable solids

Eftychios Sifakis, Tamar Shinar, Geoffrey Irving, Ronald Fedkiw

August 2007 SCA '07: Proceedings of the 2007 ACM SIGGRAPH/Eurographics symposium on Computer animation

Publisher: Eurographics Association

Additional Information:

Full text available:  pdf(5.90 MB)

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Although mesh-based methods are efficient for simulating simple hyperelasticity, maintaining and adapting a mesh-based representation is less appealing in more complex scenarios, e.g. collision, plasticity and fracture. Thus, meshless or point-based ...

7 Inverse kinematics positioning using nonlinear programming for highly articulated figures

 Jianmin Zhao, Norman I. Badler

October 1994 ACM Transactions on Graphics (TOG), Volume 13 Issue 4

Publisher: ACM

Full text available:  pdf(2.23 MB)

[Additional Information](#): [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#), [review](#)

An articulated figure is often modeled as a set of rigid segments connected with joints. Its configuration can be altered by varying the joint angles.

Although it is straight forward to compute figure configurations given joint angles (forward kinematics), ...

Keywords: articulated figures, inverse kinematics, nonlinear programming

8 A state event detection algorithm for numerically simulating hybrid

 systems with model singularities

Joel M. Esposito, Vijay Kumar

January 2007 ACM Transactions on Modeling and Computer Simulation (TOMACS), Volume 17 Issue 1

Publisher: ACM

Full text available:  pdf(350.72 KB)

[Additional Information](#): [full citation](#), [abstract](#), [references](#), [index terms](#)

This article describes an algorithm for detecting the occurrence of events, which signify discontinuities in the first derivative of the state variables, while simulating a set of nonsmooth differential equations. Such combined-discrete continuous systems ...

Keywords: Hybrid systems, discontinuities, event detection, model singularities, numerical integration

9 Motion sketching for control of rigid-body simulations

 Jovan Popović, Steven M. Seitz, Michael Erdmann

October 2003 ACM Transactions on Graphics (TOG), Volume 22 Issue 4

Publisher: ACM

Full text available:  pdf(156.23 KB)

[Additional Information](#): [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#), [review](#)

Motion sketching is an approach for creating realistic rigid-body motion. In this approach, an animator sketches how objects should move and the system computes a physically plausible motion that best fits the sketch. The sketch is specified with a mouse-based ...

Keywords: Physically based animation, animation with constraints, user

interface design

10 Fluid simulation: SIGGRAPH 2007 course notes

 Video files associated with this course are available from the citation page

Robert Bridson, Matthias Müller-Fischer
August 2007 SI GGRAPH '07: ACM SIGGRAPH 2007 courses
Publisher: ACM

Full text available:  pdf(5.60 MB) Additional Information: [full citation](#), [appendices and supplements](#), [abstract](#), [references](#)

Animating fluids like water, smoke, and fire by physics-based simulation is increasingly important in visual effects and is starting to make an impact in real-time games. This course goes from the basics of 3D fluid flow to the state of the art in graphics. ...

11 Hybrid transition density approximation for efficient recursive prediction of

 nonlinear dynamic systems

Marco F. Huber, Uwe D. Hanebeck
April 2007 I PSN '07: Proceedings of the 6th international conference on Information processing in sensor networks

Publisher: ACM

Full text available:  pdf(575.92 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

For several tasks in sensor networks, such as localization, information fusion, or sensor scheduling, Bayesian estimation is of paramount importance. Due to the limited computational and memory resources of the nodes in a sensor network, evaluation of ...

Keywords: hybrid density, nonlinear prediction, probability density approximation, recursive bayesian estimation

12 Controllable smoke animation with guiding objects

 Lin Shi, Yizhou Yu
January 2005 ACM Transactions on Graphics (TOG), Volume 24 Issue 1
Publisher: ACM

Full text available:  pdf(246.85 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [cited by](#), [index terms](#), [review](#)

This article addresses the problem of controlling the density and dynamics of smoke (a gas phenomenon) so that the synthetic appearance of the smoke (gas) resembles a still or moving object. Both the smoke region and the target object are represented ...

Keywords: Constrained animation, fluid simulation, implicit functions, level sets, shape matching, shape transformations, velocity constraints

13 Accurate on-line avatar control with collision anticipation

 Manuel Peinado, Daniel Meziat, Damien Maupu, Daniel Raunhardt, Daniel Thalmann, Ronan Boulic

November 2007 VRST '07: Proceedings of the 2007 ACM symposium on Virtual reality software and technology

Publisher: ACM

Full text available:  pdf(5.80 MB)

Additional Information: full citation, abstract, references, index terms

Interactive control of a virtual character through full body movement has a wide range of applications. However, there is a need for systems that accurately reproduce the motion of a performer while accounting for surrounding obstacles. We propose an ...

Keywords: character animation, collision avoidance, inverse kinematics, motion capture, virtual reality

14 Dynamo: dynamic, data-driven character control with adjustable balance

 Paweł Wrotek, Odest Chadwicke Jenkins, Morgan McGuire

July 2006 sandbox '06: Proceedings of the 2006 ACM SIGGRAPH symposium on Videogames

Publisher: ACM

Full text available:  pdf(822.64 KB)

Additional Information: full citation, abstract, references, cited by, index terms

Dynamo (DYNAmic MOTion capture) is an approach to controlling animated characters in a dynamic virtual world. Leveraging existing methods, characters are simultaneously physically simulated and driven to perform kinematic motion (from mocap or other ...

Keywords: animation, motion capture, physical simulation, rag doll

15 Motion prediction for caching and prefetching in mouse-driven DVE

 navigation

Addison Chan, Rynson W. H. Lau, Beatrice Ng

February 2005 ACM Transactions on Internet Technology (TOIT), Volume 5 Issue 1

Publisher: ACM

Full text available:  pdf(683.33 KB)

Additional Information: full citation, abstract, references, index terms

A distributed virtual environment (DVE) allows geographically separated users to participate in a shared virtual environment via connected networks. However, when the users are connected by the Internet, bandwidth limitation and network latency may seriously ...

Keywords: Mouse motion prediction, caching and prefetching, distributed virtual environments, virtual navigation

16 Proto-value Functions: A Laplacian Framework for Learning

Representation and Control in Markov Decision Processes

Sridhar Mahadevan, Mauro Maggini

October 2007 The Journal of Machine Learning Research, Volume 8

Publisher: MIT Press

Full text available:  pdf(1.29 MB)

Additional Information: full citation, abstract, index terms

This paper introduces a novel *spectral* framework for solving Markov decision

processes (MDPs) by jointly learning representations and optimal policies. The major components of the framework described in this paper include: (i) A general scheme ...

17 Melting and flowing

Mark Carlson, Peter J. Mucha, R. Brooks Van Horn, III, Greg Turk
July 2002 SCA '02: Proceedings of the 2002 ACM SIGGRAPH/Eurographics symposium on Computer animation

Publisher: ACM

Full text available:  pdf(4.77 MB) Additional Information: full citation, abstract, references, cited by

We present a fast and stable system for animating materials that melt, flow, and solidify. Examples of real-world materials that exhibit these phenomena include melting candles, lava flow, the hardening of cement, icicle formation, and limestone deposition. ...

Keywords: animation, computational fluid dynamics, melting, solidifying

18 Stable, circulation-preserving, simplicial fluids

Sharif Elcott, Yiyi Tong, Eva Kanso, Peter Schröder, Mathieu Desbrun
January 2007 ACM Transactions on Graphics (TOG), Volume 26 Issue 1

Publisher: ACM

Full text available:  pdf(7.00 MB) Additional Information: full citation, abstract, references, index terms

Visual quality, low computational cost, and numerical stability are foremost goals in computer animation. An important ingredient in achieving these goals is the conservation of fundamental motion invariants. For example, rigid and deformable body simulation ...

Keywords: Fluid animation, Lie advection, stable fluids, vorticity preservation

19 Airport terminal-approach safety and capacity analysis using an agent-based model

Yue Xie, John Shortle, George Donohue
December 2004 WSC '04: Proceedings of the 36th conference on Winter simulation

Publisher: Winter Simulation Conference

Full text available:  pdf(453.35 KB) Additional Information: full citation, abstract, references

The consistent growth of air traffic demand is causing the operational volumes at hub airports to approach their maximum capacities. With this growth, delays are increasing, and safety is becoming a more crucial problem. The terminal approaching and ...

20 Multiple interacting liquids

Frank Losasso, Tamar Shinar, Andrew Selle, Ronald Fedkiw
July 2006 SIGGRAPH '06: ACM SIGGRAPH 2006 Papers

Publisher: ACM

Additional Information: [full citation](#),

Full text available:  [pdf\(2.58 MB\)](#)  [mov\(20:52 MIN\)](#)

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references, cited
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The particle level set method has proven successful for the simulation of *two* separate regions (such as water and air, or fuel and products). In this paper, we propose a novel approach to extend this method to the simulation of as many regions ...

Keywords: gases, level sets, liquids, multiphase fluids

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